

Memorandum
March 18, 1985

TO: Mark S. Coleman, Deputy Commissioner
for Environmental Health Services

THRU: Dale McHard, Chief *DM*
Radiation and Special
Hazards Service

FROM: Robert L. Criag, Director *RLE*
Radiation Protection Division

SUBJECT: Remedial Action Plan for Sooner Dial Co. Site in Clinton

Previous work has established the presence of radioactive contamination of this site in amounts that require remedial action be taken.

The criteria to be considered in preparing a plan of action are:

1. Oklahoma Radiation Protection Regulations.
2. "Soil Contamination Guidance" Conference of Radiation Control Directors.
3. "Proposed Radiological Criteria for Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites", U.S. Department of Energy.
4. "Management of Water Treatment Plant Sludge Containing Elevated Levels of Radium", Illinois Department of Nuclear Safety.
5. "Decommissioning and Decontamination Plan for the Luminous Processes, Inc. Site located in Clarke County Georgia", Georgia Department of Human Resources and Georgia Department of Natural Resources.

Section 13.3 of the Oklahoma Radiation Protection Regulations states "A user may dispose of radioactive waste only in areas and by procedures approved by the Oklahoma State Department of Health." The other mentioned criteria are consistent in requiring that material which has a radium concentration exceeding 5 picocuries of radium per gram be removed and sent to a facility which is licensed to receive and dispose of such material. They are also consistent in requiring that items of equipment and surfaces in buildings which are subject to be used by the public, and to which access is not controlled for purposes of radiation protection, should not have more than 100 disintegrations per minute of fixed alpha

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emitting radioactive material per 100 square centimeters of surface area nor more than 20 disintegrations per minute of easily removeable alpha emitting radioactive material per 100 square centimeters of surface area.

The National Council on Radiation Protection recommends that members of the public should not receive more than 500 millirems of radiation exposure per year.

In many places on the site the external gamma ray exposure levels were in excess of the recommended limit, ranging up to 17,500 millirem per year (measured 3 feet above the surface of the ground). This is the exposure that a person continuously present at that spot (24 hours per day and 365 days per year) would receive.

It is highly unlikely that any one would remain at that location for any time period which would result in more than a minimal exposure, nevertheless this represents a potential for exposure which is in excess of a national standard and should be removed.

This site contains radium in the soil which exceeds the concentrations requiring removal before release for public use, the building (Starcade) has fixed alpha radioactivity on the floor, and the area to the south of the Starcade building has external gamma radiation levels which exceed those recommended by NRCP. Because of this, remedial action is required. This action should be taken in several phases as outlined below.

Phase I -

- A. Remove and place in barrels the surface and near surface radioactivity near the water meters on the west edge of the site.
- B. Store the removed material in a secure, locked and posted area.
- C. Install a fence around the contaminated area. The exposure rate at the fence after removal of the surface and near surface radioactivity should be less than 50 microroentgens per hour.

Phase II -

- A. Establish a new grid system on the site. The grid system should be referenced to some easily identified point on the site so that it may be used in the future in identifying areas from which soil must be removed. The new grid system should extend from the west side of the alley to Tenth street and from the street on the north side of the site to the D&B Sales building on the south. Provisions should be made for extending the grid system should information be gained indicating that there is radioactivity outside the gridded area.

- B. Measure the gamma rays at the surface of the ground at each grid intersection with a 2 in. by 2 in. NaI scintillation detector with a scalar and single channel analyzer. The single channel analyzer should be set to detect gamma rays with energies from 550 keV to 650 keV. The counter should be run for 5 minutes at each point.
- C. Using a hand-held 1 in. X 1 in. NaI scintillation detector set to detect gamma rays with energies greater than 50 keV, measure the gamma ray rate at 3 feet above the surface of the ground at each grid intersection.
- D. Drive a 1/4 inch steel rod into the ground at each grid intersection and measure the depth of the soil.

Phase III -

- A. Drill holes at 10% of the grid intersections and take core samples of the soil. The holes in areas where the soil depth is more than 6 inches should be drilled with a Henderson Tube to facilitate separation of the core samples by six increments of depth. The holes should be drilled to the underlying sandstone. Separate the cores into six inch increments and analyze each increment for its radium concentration.

Phase IV

Using the information developed in Phase II and Phase III determine the areas and the depths where the concentration of radium exceeds 5 pCi/gm and calculate the volume of soil to be removed.

Phase V

Select a contractor to remove and ship the contaminated soil to a final disposal site.

Phase VI

Remove the contaminated soil and ship it to the final disposal site. The Radiation Protection Division should act in an oversight capacity during this Phase.

Phase VII

Resurvey the site to ensure that no areas of the site exceed the standards for release for use by the public. This will involve a repetition of the measurements of Phase II.

Phase VIII

Formally release the site.